

The results of the microscale CO analysis (Table 5.7-1) indicate that this project would not result in violations of either the one-hour (35.0 parts per million (ppm)) or eight-hour (9.0 ppm) NAAQS for CO. All of the predicted 1-hour CO concentrations are well below the NAAQS of 35.0 ppm. The highest predicted 8-hour concentration is 8.6 ppm at the 146<sup>th</sup> Street interchange and below the NAAQS of 9.0 ppm. It is unlikely that this concentration level would ever be experienced by anyone because some extremely conservative assumptions were built into the modeling for this project. The most conservative assumption is the locating of receptors along the edge of the right-of-way, which means a person would have to be located on the right-of-way for 8 hours to experience the calculated maximum concentration.

**Table 5.7-1**  
**Predicted Carbon Monoxide Concentrations (in parts per million)**

Location	2000 Existing		2010 First Year of Operation		2025 No Action		2025 Build	
	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour	1-hour	8-hour
<b>116<sup>th</sup> &amp; US 31</b>	6.4	3.9	7.7	4.8	5.9	3.5	7.6	4.7
<b>146<sup>th</sup> &amp; US 31</b>	3.6	1.9	8.5	5.4	3.6	1.9	8.6	5.4

Note: 1-hour background = 3 ppm  
8-hour background = 1.5 ppm

## 5.8 Noise

As discussed in Section 4.8.1, noise impacts for this project were evaluated in accordance with the FHWA Noise Assessment Guidelines and INDOT Guidelines.

*No-Action Alternative:* Compared to existing conditions, projected noise levels would approach or exceed the noise abatement criteria at 20 additional receptors (71 receptors in all) under the No-Action Alternative. Projected noise levels at the receptors analyzed range from 52 decibels (dBA) to 74 dBA. No receptors are projected to experience a noise increase of greater than 2 dBA over existing (Table 5.8-1).

*Alternatives F1 through F6:* Compared to existing conditions, project noise levels would approach or exceed the noise abatement criteria at 25 additional receptors (76 receptors in all) under these alternatives (Appendix A). Projected noise levels at the receptors analyzed range from 59 dBA to 74 dBA. Projected noise level increases, compared to existing levels, are less than 6 dBA for all of the receptors analyzed for this alternative (Table 5.8-1).

*Alternatives G1 through G6:* Compared to existing conditions, project noise levels would approach or exceed the noise abatement criteria at three receptors located near the off-alignment and 52 receptors near the existing alignment of US 31 (55 receptors in all) for these alternatives (Appendix A). One of the receptors located near the off-alignment is projected to increase by 15 dBA or more. Some Alternative G noise receivers experience noise levels less than the existing. This occurs at noise receivers that are adjacent to existing US-31 and north of the location where Alternative G transitions to an off-alignment. Projected noise levels at the receptors analyzed range from 55 dBA to 74 dBA (Table 5.8-1).



Table 5.8-1  
Noise Impacts

Receiver*	Existing		No Action			F Alternatives			G Alternatives		
	Noise Level	Impact	Noise Level	Change vs. Existing	Impact	Noise Level	Change vs. Existing	Impact	Noise Level	Change vs. Existing	Impact
RN100	67.6	X	68.4	0.8	X	Displaced			Displaced		
RN115	66.3	X	67.3	1.0	X	69.9	3.6	X	69.9	3.6	X
RN125	61.3		62.4	1.1		66.3	5.0	X	66.3	5.0	X
RN130	65.6		66.5	0.9	X	69.7	4.1	X	69.7	4.1	X
RN140	69.1	X	70.6	1.5	X	73.2	4.1	X	73.2	4.1	X
RN145	68.0	X	69.6	1.6	X	72.4	4.4	X	72.4	4.4	X
RN150	65.1		66.6	1.5	X	69.7	4.6	X	69.7	4.6	X
RN155	65.6		67.1	1.5	X	70.2	4.6	X	70.2	4.6	X
RN165	63.8		65.3	1.5		68.5	4.7	X	68.5	4.7	X
RN170	64.2		65.7	1.5		68.9	4.7	X	68.9	4.7	X
RN175	67.2	X	68.7	1.5	X	71.0	3.8	X	71.0	3.8	X
RN186	63.3		64.2	0.9		66.0	2.7	X	66.0	2.7	X
RN210	66.7	X	67.6	0.9	X	Displaced			65.4	(1.3)	
RN235	64.8		66.5	1.7	X	66.6	1.8	X	63.0	(1.8)	
RN240	66.0	X	67.6	1.6	X	67.5	1.5	X	64.1	(1.9)	
RN245	65.1		66.7	1.6	X	67.0	1.9	X	63.2	(1.9)	
RN260	64.6		66.1	1.5	X	68.4	3.8	X	62.4	(2.2)	
RN275	62.3		63.8	1.5		66.0	3.7	X	60.1	(2.2)	
RN285	62.6		64.1	1.5		66.6	4.0	X	60.4	(2.2)	
RN295	63.6		65.0	1.4		68.6	5.0	X	61.3	(2.3)	
RN300	64.8		66.2	1.4	X	70.2	5.4	X	62.5	(2.3)	
RN305	65.9		67.3	1.4	X	Displaced			63.6	(2.3)	
RN310	65.0		66.4	1.4	X	69.1	4.1	X	62.7	(2.3)	
RN315	68.1	X	69.5	1.4	X	72.4	4.3	X	65.8	(2.3)	
RN320	63.6		65.1	1.5		67.6	4.0	X	61.4	(2.2)	
RN325	67.0	X	68.4	1.4	X	71.0	4.0	X	64.7	(2.3)	
RN330	62.7		64.2	1.5		66.4	3.7	X	60.5	(2.2)	
RN335	69.4	X	70.8	1.4	X	72.9	3.5	X	67.1	(2.3)	X
RN337	72.5	X	73.9	1.4	X	72.0	-0.5	X	Displaced		
RN340	65.7		67.1	1.4	X	Displaced			63.6	(2.1)	
RN345	68.5	X	70.0	1.5	X	Displaced			62.1	(6.4)	
RN360	69.8	X	71.3	1.5	X	Displaced			Displaced		
RN370	59.1		60.6	1.5		66.0	6.9	X	62.5	3.4	
RS105	64.1		65.6	1.5		69.9	5.8	X	60.8	(3.3)	
RS110	68.7	X	70.3	1.6	X	Displaced			Displaced		
RS115	64.7		66.2	1.5	X	68.6	3.9	X	62.6	(2.1)	
RS120	69.5	X	71.2	1.7	X	Displaced			67.5	(2.0)	X
RS125	68.3	X	69.9	1.6	X	Displaced			66.3	(2.0)	X
RS130	68.2	X	69.8	1.6	X	Displaced			66.2	(2.0)	X
RS135	68.3	X	69.9	1.6	X	70.8	2.5	X	66.3	(2.0)	X
RS140	61.8		63.4	1.6		66.6	4.8	X	59.8	(2.0)	
RS145	62.4		63.9	1.5		67.2	4.8	X	60.3	(2.1)	
RS147	61.5		63.0	1.5		66.2	4.7	X	59.4	(2.1)	
RS148	62.1		63.6	1.5		66.8	4.7	X	60.0	(2.1)	
RS149	63.3		64.8	1.5		68.1	4.8	X	61.2	(2.1)	
RS150	63.2		64.8	1.6		68.1	4.9	X	61.2	(2.0)	
RS151	63.9		65.4	1.5		68.8	4.9	X	61.8	(2.1)	
RS155	63.9		65.4	1.5		68.8	4.9	X	61.8	(2.1)	
RS159	61.9		63.4	1.5		66.7	4.8	X	59.8	(2.1)	
RS160	64.5		66.0	1.5	X	69.4	4.9	X	62.4	(2.1)	
RS161	62.2		63.7	1.5		66.9	4.7	X	60.1	(2.1)	
RS162	61.3		62.8	1.5		66.0	4.7	X	59.2	(2.1)	
RS163	62.1		63.7	1.6		66.8	4.7	X	60.1	(2.0)	
RS164	62.0		63.5	1.5		66.8	4.8	X	60.0	(2.0)	
RS165	67.1	X	68.6	1.5	X	Displaced			65.0	(2.1)	
RS166	62.0		63.5	1.5		66.8	4.8	X	60.0	(2.0)	
RS167	61.9		63.4	1.5		66.7	4.8	X	59.8	(2.1)	
RS169	62.5		64.0	1.5		67.4	4.9	X	60.4	(2.1)	
RS170	67.1	X	68.7	1.6	X	Displaced			65.1	(2.0)	
RS175	68.0	X	69.6	1.6	X	Displaced			66.0	(2.0)	X
RS180	68.9	X	70.5	1.6	X	Displaced			66.9	(2.0)	X
RS185	69.5	X	71.2	1.7	X	Displaced			67.5	(2.0)	X
RS190	69.6	X	71.3	1.7	X	Displaced			67.7	(1.9)	X
RS195	69.8	X	71.5	1.7	X	Displaced			67.9	(1.9)	X
RS200	69.5	X	71.1	1.6	X	Displaced			67.5	(2.0)	X
RS205	69.4	X	71.1	1.7	X	Displaced			67.4	(2.0)	X
RS210	70.8	X	72.5	1.7	X	Displaced			68.8	(2.0)	X
RS215	65.8		67.3	1.5	X	Displaced			63.8	(2.0)	
RS220	62.4		63.9	1.5		67.5	5.1	X	60.4	(2.0)	
RS250	65.5		67.1	1.6	X	Displaced			63.6	(1.9)	
RS255	69.3	X	70.8	1.5	X	Displaced			68.2	(1.1)	X
RS260	66.3	X	67.7	1.4	X	Displaced			65.2	(1.1)	
RS275	70.2	X	71.3	1.1	X	Displaced			68.1	(2.1)	X
RS280	69.7	X	70.9	1.2	X	Displaced			67.4	(2.3)	X
RS281	63.7		65.2	1.5		67.4	3.7	X	60.6	(3.1)	
RS282	63.5		65.0	1.5		67.1	3.6	X	60.2	(3.3)	
RS283	63.0		64.5	1.5		66.6	3.6	X	59.6	(3.4)	
RS284	62.8		64.3	1.5		66.4	3.6	X	59.3	(3.5)	
RS285	69.0	X	70.1	1.1	X	Displaced			66.6	(2.4)	X
RS286	62.4		63.9	1.5		66.0	3.6	X	58.8	(3.6)	
RS290	67.1	X	68.1	1.0	X	Displaced			64.6	(2.5)	
RS295	65.8		66.8	1.0	X	69.5	3.7	X	64.6	(1.2)	
RS300	64.7		65.7	1.0		68.3	3.6	X	64.9	0.2	
RS305	69.9	X	71.0	1.1	X	Displaced			68.6	(1.3)	X
RS310	67.7	X	68.7	1.0	X	Displaced			68.4	0.7	X
RS315	67.6	X	68.6	1.0	X	Displaced			68.8	1.2	X
RS320	67.3	X	68.4	1.1	X	Displaced			69.1	1.8	X
RS325	62.6		63.5	0.9		66.2	3.6	X	65.0	2.4	
RS330	62.9		63.9	1.0		66.5	3.6	X	66.5	3.6	X
RS335	67.6	X	68.6	1.0	X	Displaced			Displaced		
RS400	65.3		66.2	0.9	X	71.1	5.8	X	71.1	5.8	X
RS405	63.1		64.3	1.2		68.4	5.3	X	68.4	5.3	X
RS410	61.9		63.2	1.3		67.2	5.3	X	67.2	5.3	X
RS411	65.1		66.4	1.3	X	68.5	3.4	X	68.5	3.4	X
RS412	62.2		63.5	1.3		66.2	4.0	X	66.2	4.0	X
RS425	62.1		63.4	1.3		67.6	5.5	X	67.6	5.5	X
RS505	65.7		66.6	0.9	X	68.6	2.9	X	68.6	2.9	X
RS510	70.6	X	71.6	1.0	X	74.0	3.4	X	74.0	3.4	X
RS515	69.6	X	70.6	1.0	X	73.0	3.4	X	73.0	3.4	X
RS520	69.5	X	70.5	1.0	X	72.8	3.3	X	72.8	3.3	X
RS525	69.4	X	70.3	0.9	X	72.7	3.3	X	72.7	3.3	X
RS530	69.3	X	70.3	1.0	X	72.6	3.3	X	72.6	3.3	X
RS535	69.6	X	70.6	1.0	X	72.9	3.3	X	72.9	3.3	X
RS540	69.7	X	70.7	1.0	X	73.1	3.4	X	73.1	3.4	X
RS545	69.7	X	70.7	1.0	X	73.1	3.4	X	73.1	3.4	X
RS550	69.6	X	70.6	1.0	X	73.0	3.4	X	73.0	3.4	X
RS555	69.7	X	70.7	1.0	X	73.1	3.4	X	73.1	3.4	X
RS560	69.8	X	70.7	0.9	X	73.2	3.4	X	73.2	3.4	X
RS565	70.1	X	71.0	0.9	X	73.5	3.4	X	73.5	3.4	X
RS600	65.3		66.2	0.9	X	Displaced			Displaced		
RS605	65.9		66.8	0.9	X	Displaced			Displaced		
RN710	52.0		52.0	0.0		N/A			68.7	16.7	X
RS770	52.0		52.0	0.0		N/A			66.3	14.3	X
RS980	52.0		52.0	0.0		N/A			66.1	14.1	X
Total	52.0 - 72.5	51	52.0 - 73.9	0.0 - 1.7	71	65.1 - 74.0	-0.5 - 5.8	76	58.8 - 73.2	0.2 - 65.1	55

Notes

1. All receptors analyzed are activity category B uses.
- \* - Refers to noise receptors in Appendix A
2. An impact is projected where predicted noise levels exceed 66 dBA, or where noise levels are predicted to increase by 15 dBA or more, when compared to existing conditions.

## **5.9 Natural Resources**

Methodologies, existing environments, environmental consequences and applicable mitigation plans regarding streams, wild and scenic rivers, floodplains, wetlands, current land cover and existing habitat characteristics, flora and fauna as well as rare, endangered, threatened, proposed or candidate species will be addressed in relation to Alternatives F1 through F6 and Alternatives G1 through G6 of the US 31 project.

### **5.9.1 Soils and Geology**

According to the Indiana NRCS, there are no Soils of Statewide Importance in Hamilton County. Furthermore, there would be no significant impacts to geological features within the county.

### **5.9.2 Terrestrial Habitat/Wildlife**

The No-Action Alternative would incur no impacts to terrestrial habitat and wildlife. There are more than twice the amount of impacts to forestland and herbaceous rangeland associated with Alternatives G1 through G6 than Alternatives F1 through F6 (Table 5.1). There is little shrub/brush rangeland in the project area. Impacts to this type of land feature are similar for the build alternatives. Impacts to wetland areas are discussed in Section 5.12. Habitat impacts are illustrated in Appendix A and are based on land use (see map legend).

Impacts related to Alternatives F1 through F6 and the southern portion of Alternatives G1 through G6 (south of 156<sup>th</sup> Street) occur along the corridor of the existing US 31 alignment. These areas have experienced impacts such as development, fragmentation, and noise. It is unlikely that these alternatives would adversely effect habitat or wildlife populations.

The northern, off-alignment portion of Alternatives G1 through G6 experiences the most impacts to natural areas. However, development throughout this area (housing, urban, agriculture) has impacted terrestrial habitat. Natural areas (forested, shrub/brush, and herbaceous) within the northern portion of Alternatives G1 through G6 corridor are generally small (less than 10 acres), fragmented, and isolated. Research has shown that fragmented habitats, based on their size, can be detrimental to wildlife populations, both resident and transient (Saunders, 1989; Verboom and van Apeldorn, 1990; and, Fahrig and Merriam, 1985).

### **5.9.3 Endangered, Threatened, and Proposed Species**

The No-Action Alternative would incur no impacts to protected species.

#### ***Federally Listed Species***

The US Fish and Wildlife Service (USFWS) has indicated that the Cool Creek area is in range of the Indiana bat and bald eagle, both federally listed species. Yet, the USFWS response states that no record of either species has been documented near or within the project boundary. As well, no federally listed ETP species, flora or fauna, were observed during the qualitative assessment of the project area. Also, there are no federally designated critical habitat areas

within the project area. Correspondence with the USFWS has, however, indicated Indiana bat concerns specific to Cool Creek in the area of US 31/SR 431 (Appendix C, Section 7 Correspondence). A bat survey was recommended if this area of Cool Creek was to be impacted. A bat survey was conducted in May/June of 2002, supervised by Dr. John Whitaker, Indiana State University. No bats were netted as a result of the survey. According to Dr. Whitaker, it is likely that noise from the existing facility has impacted the habitat. The proposed action is not likely to adversely affect ETP species or designated critical habitat. The USFWS concurred with the findings of the bat survey and, in a letter dated April 30, 2003, concluded Section 7 consultation (Appendix C, Section 7 Correspondence).

### ***State Listed Species***

No state ETP species have been reported within the project area within the last 13 years. As well, no state listed ETP species, flora or fauna, were observed during the qualitative assessment of the project area. The IDNR has documentation of the American badger (last documented 1989) and red-shouldered hawk (last documented 1957) within the project area.

The likelihood of ETP species occurring within the project boundary is limited due to lack of suitable habitat and the proximity of potential habitat to highly populated areas. Carmel and the surrounding area have experienced substantial growth in the last 10 years. Since this expansion, no record of either of these species has been recorded. In addition, the low-moderate quality of the areas that may be suitable for these species and the proximity of the project site to a densely populated area diminish the potential that either of these species may utilize the remaining habitat within the proposed project area.

## **5.10 Water Resources**

### **5.10.1 Surface Water**

Surface hydrology was determined using USGS topographic maps, aerial photography, information obtained from the Indiana Department of Natural Resources (IDNR), Division of Water, and field verifications. All streams exhibiting “ordinary high water mark” characteristics are considered “waters of the US,” and are therefore regulated by the USACE. As well, a majority of the ditches within the project area are legal drains and are therefore regulated by the Hamilton County Drainage Board.

The No-Action Alternative would incur no impacts to surface water resources. Alternatives F1 through F6 would have 11 stream crossings and would impact 3,165 to 3,258 linear feet of stream. Alternatives G1 through G6 would have 15 stream crossings and would impact 5,272 to 5,375 potential linear feet of stream. Both short and long term water quality impacts would result from any chosen build alternative. Long term impacts would be a result of stream alteration which could relate to aquatic habitat loss. Wider roadways also result in an increase in impervious surfaces. This, coupled with more traffic, could result in an increase in oil and grease runoff.

In a letter dated February 7, 2001 the US Army Corp of Engineers, Louisville District (Appendix C, Early Coordination) stated that the following waterways under their jurisdiction may be impacted by the project: Little Cool Creek (Appendix A, Sheet 5), Hiway Run (Appendix A,

Sheets 6A, 6B and 6C), Grassy Branch (Appendix A, Sheet 8), Cool Creek(Appendix A, Sheets 14 and 15), Jones Ditch (Appendix A, Sheet 19), Lindley Ditch (Appendix A, Sheet 20) and two unnamed tributaries to Cool Creek (Appendix A, Sheets 14 and 15). Impacts to waterways within the project corridor are identified below.

All but one of the stream crossings associated with Alternatives F1 through F6 are upgrades of existing crossings. The streams at these crossings have already been impacted by culverts or bridges. Most of the impacts for Alternatives F1 through F6 involve widening the right-of-way, extending culverts. The only new crossing for Alternatives F1 through F6 is an access to MacGregor Park off of SR 38 that would cross Lindley Ditch. At the point of the proposed crossing, Lindley Ditch is deeply furrowed. The banks of the stream are unstable and are severely eroded. A list of the stream crossings associated with Alternatives F1 through F6 is as follows; the new crossing is in bold:

- Unnamed Tributary of Williams Creek (Appendix A, Sheet 2)
- Unnamed Tributary of Little Cool Creek (Appendix A, Sheet 5)
- Little Cool Creek (Appendix A, Sheet 5)
- Hiway Run (Appendix A, Sheets 6A, 6B and 6C)
- Cool Creek (Appendix A, Sheets 6A, 6B and 6C)
- Unnamed Tributary of Cool Creek (Appendix A, Sheet 7)
- Unnamed Tributary of Cool Creek (Appendix A, Sheet 7)
- Grassy Branch (Appendix A, Sheet 8)
- Cool Creek (Appendix A, Sheets 10 and 11)
- Jones Ditch (Appendix A, Sheet 12)
- Lindley Ditch (Appendix A, Sheets 12 and 13)
- **Lindley Ditch: new access to MacGregor Park (Appendix A, Sheets 13)**
- **Lindley Ditch: new access to Lindley Farm (Appendix A, Sheets 13)**

The stream crossings associated with Alternatives G1 though G6 are the same as Alternatives F1 through F6 from I-465 north to 156<sup>th</sup> Street. At this point, Alternatives G1 through G6 are within an off-alignment corridor. All but one stream crossing north of Alternatives G1 through G6 divergence are new crossings. Five of the seven new crossings occur in Section 7, Township 18 North, Range 4 East, and are associated with Cool Creek and three unnamed tributaries. The riparian corridors of these streams are moderately well developed and buffered. The northern crossings are over Jones Ditch and Lindley Ditch. These streams predominantly serve as agricultural drainage and are not high quality. A list of the stream crossings associated with Alternatives G1 through G6 is as follows; the new crossings are in bold:

- Unnamed Tributary of Williams Creek (Appendix A, Sheet 2)
- Unnamed Tributary of Little Cool Creek (Appendix A, Sheet 5)
- Little Cool Creek (Appendix A, Sheet 5)
- Hiway Run (Appendix A, Sheets 6A, 6B and 6C)
- Cool Creek (Appendix A, Sheets 6A, 6B and 6C)
- Unnamed Tributary of Cool Creek (Appendix A, Sheet 14)
- Unnamed Tributary of Cool Creek (Appendix A, Sheet 14)
- **Cool Creek (Appendix A, Sheets 14 and 15)**

- **Unnamed Tributary of Cool Creek (Appendix A, Sheets 14 and 15)**
- **Unnamed Tributary of Cool Creek (Appendix A, Sheet 15)**
- **Unnamed Tributary of Cool Creek (Appendix A, Sheet 15)**
- **Cool Creek (Appendix A, Sheet 15)**
- **Jones Ditch (Appendix A, Sheet 19)**
- **Jones Ditch: access to existing US 31 (Appendix A, Sheet 19)**
- **Lindley Ditch (Appendix A, Sheet 20)**

The USFWS noted that the area surrounding Cool Creek and Hiway Run near the interchange at US 31 and SR 431 provides a substantial block of wildlife habitat in relation to the large amount of development going on in the vicinity and should be avoided. Specifically they note that the stream corridors are of good quality and appear to be good streams for aquatic habitat in the area. The USFWS recommends avoiding the relocation of Cool Creek, and keeping channel/bank disturbance minimal; avoiding disturbance of forested areas within 100-feet on either side of the creek; minimizing tree clearing activity within the forested floodplain. All recommendations also reference that any disturbances created by the construction of bridges be kept minimal (Appendix C).

### **5.10.2 Groundwater**

The No-Action Alternative would incur no impacts to groundwater resources. Alternatives F1 through F6 would impact the wellhead protection zones (WPZ) of four public wells while Alternatives G1 through G6 would impact one WPZ (Appendix A, Sheets 7, 9, and 14). Three wells are located within the Westfield/Washington Township Schools campus northeast of SR 32 and US 31. The fourth is located northeast of the intersection of US 31 and 156<sup>th</sup> Street. Each of these wells has a 200-foot radius wellhead protection zone (WPZ). Construction activities would impact two of the WPZ on the school campus as well as the 156<sup>th</sup> Street WHP zone. As per guidelines set forth in the Wellhead Protection Management Plans for Westfield (PWSID# IN5229021) and Western Hamilton County (PWSID# IN5229009), any new development or upgrade of existing facilities requires correspondence with the Westfield Utilities Department. No impacts to groundwater are anticipated due to construction activities because the proposed build alternatives are at-grade or elevated.

Groundwater can potentially be adversely impacted by spills. Surface and subsurface releases of contaminants can impact groundwater via permeation through the soil and subsurface profile and infiltration at points of interaction between surface water and groundwater (i.e.; sinkholes in karst environments, uncontained wells, structural footings, etc.) As part of the Purpose and Need, the project would reduce congestion along US 31 and increase safety. The result would be a decrease in the potential for vehicular accidents that could result in spill incidents on the existing alignment. Conversely, the spill potential within the corridor containing the off-alignment portion of Alternatives G1 through G6 would increase in response to previously non-present traffic.

The project area is not located in karst topography. The only structures located within the project area with structural footings that could provide an interaction with groundwater would be telecommunications towers (average tower caissons are approximately 30 feet deep); however, these towers are usually located on elevated portions of the topography, not where spilled materials would collect. The WPZs along the alignment could provide opportunity for groundwater interaction. The aforementioned Wellhead Protection Management Plans detail contingencies for emergency response to spills within WPZs.

### **5.10.3 Special Status Streams**

There are no Indiana Special Streams (IDNR), Indiana Waters Designated for Special Protection (IDEM), Navigable Waters (USACE), Indiana Streams Associated with ETR Species (USFWS), or Wild and Scenic Rivers (NPS) in the project area. No special status streams would be impacted by any of the alternatives.

## **5.11 Floodplains/Floodways**

Flood Insurance Rate Maps (FIRM), provided by the Federal Emergency Management Agency (FEMA), were used to determine the locations and areas of affected 100-year floodplains and floodways. Geographical Information System (GIS) was used to assess the amount of impacted floodplains and floodways located within each project alternative.

The No-Action Alternative would incur no impacts to floodplains or floodways. Alternatives F1 through F6 would encroach upon approximately 36 acres of 100-year floodplain and 10 acres of floodway, while Alternatives G1 through G6 would encroach upon approximately 46 acres 100-year floodplain and 18 acres of floodway. The affected floodplains and floodways are identified on the Environmental Features maps in Appendix A.

Encroachments associated with Alternatives F1 through F6 are in areas already impacted by the existing US 31 facility. Further impacts by Alternatives F1 through F6 would be slight (e.g.; road widening). Impacts of Alternatives G1 through G6 are the same as Alternatives F1 through F6 from I-465 north to 156<sup>th</sup> Street. At the point of Alternatives G1 through G6 eastward divergence, the route latitudinally crosses approximately 1,600 feet of both floodway and 100-year floodplain at two different locations (Appendix A, Sheets 14 and 15). The route in this area is an elevated highway with a combination of bridges and culverts at stream crossings. This is followed by a bridge crossing (longitudinally) at one of the narrowest portions of the floodplain (Appendix A, Sheet 15).

In addition, the IDNR regulates non-wetland forests that occur in floodways as per IC 14-28-1 § 20. Alternatives F1 through F6 would impact approximately 1.2 acres of non-wetland forested floodway while Alternatives G1 through G6 would impact approximately 4.5 acres. A majority of the impacts associated with Alternatives G1 through G6 are the Cool Creek crossing north of 151<sup>st</sup> Street (Appendix A, Sheets 14 and 15).

## 5.12 Wetlands

Wetlands as defined by the US Army Corps of Engineers (USACE) (33 CFR 328.3) and the Environmental Protection Agency (EPA) are “those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.”

Wetland determinations (delineations) were conducted using the routine method as defined in the *Corps of Engineers Wetlands Delineation Manual* (USACE, 1987). Wetlands were delineated based on three criteria: hydrophytic vegetation (water-loving plants), hydric soils (moist, highly organic soils), and signs of hydrology. Flags were placed around the perimeter of the wetlands and the area was surveyed to determine acreage.

Table 5.12-1 presents the type, size, function, and location of each wetland that would be impacted by the project alternatives. The No-Action Alternative would incur no impacts to wetlands. Of Alternatives F1 through F6, F3 and F6 have the greatest wetlands impacts (3.32 acres) (Table 5.12-2). Most of these impacts (2.67 acres) are the forested wetland associated with the folded diamond interchange option at 146<sup>th</sup> Street. This isolated wetland provides wildlife habitat and nutrient removal.

**Table 5.12-2**  
**Acres of Impacted Wetlands**

Type	No-Action Alternative	F Alternatives						G Alternatives					
		F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
Forested	0	0.27	0.57	2.67	0.27	0.57	2.67	5.13	5.43	7.53	5.13	5.43	7.53
Scrub-Shrub	0	0.05	0.05	0.05	0.05	0.05	0.05	0.34	0.34	0.34	0.34	0.34	0.34
Emergent	0	0.60	0.60	0.60	0.60	0.60	0.60	1.95	1.95	1.95	1.95	1.95	1.95
Total	0	0.92	1.22	3.32	0.92	1.22	3.32	7.42	7.72	9.82	7.42	7.72	9.82

Twenty-two wetlands were identified within the project area (Appendix A). Wetland types identified within the project area: thirteen forested, four scrub-shrub, and five emergent. Alternatives F1 through F6 impact the least wetland acreage ranging from 0.92 to 3.32 acres while Alternatives G1 through G2 have the greatest impacts ranging from 7.42 to 9.82 acres (Table 5.12-2).

Of Alternatives G1 through G6, G3 and G6 have the greatest wetland impacts (9.82 acres). Most of these impacts (7.5 acres) are forested wetlands that are associated with the previously mentioned folded diamond interchange option at 146<sup>th</sup> Street and the forested wetland at the 161<sup>st</sup> Street interchange (Table 5.12-2). This wetland is contiguous with Cool Creek and provides wildlife habitat, flood storage, and nutrient and sediment removal. Northwest of the 161<sup>st</sup> Street interchange is a complex of small wetlands contiguous to Cool Creek that would be impacted by Alternatives G1 through G6.



**Table 5.12-1  
Wetland Functions and Impacts**

Wetland Number	Type	Size (acres)	Map Location Appendix A, Sheet #	Description		Wetland Impacts by Alternative (acres)												
				Isolated	Functions	Hydrology	F1	F2	F3	F4	F5	F6	G1	G2	G3	G4	G5	G6
1	PFO		1	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
2	PFO	1.0	5	No	Flood storage, sediment/toxin removal, wildlife habitat	Little Cool Creek	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
3	PFO	4.1	6A, 6B, 6C	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.20	0.50	2.60	0.20	0.50	2.60	0.20	0.50	2.60	0.20	0.50	2.60
4	PEM	0.01	7	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.10	0.10	0.10	0.10	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00
5	PFO	9.7	14	No	Flood storage, sediment/toxin removal, wildlife habitat	Cool Creek	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.60	4.60	4.60	4.60	4.60
6	PSS	0.2	14	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.20	0.20	0.20	0.20
7	PEM	0.3	14, 15	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Cool Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.30	0.30	0.30	0.30
8	PEM	1.1	14, 15	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Cool Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.80	0.80	0.80
9	PFO	0.2	15	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Cool Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.08	0.08	0.08	0.08
10	PFO	0.1	15	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Cool Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.06	0.06	0.06	0.06
11	PFO	0.2	15	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
12	PFO	0.8	15	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Cool Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.04	0.04	0.04	0.04
13	PFO	0.1	15	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Cool Creek)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05
14	PFO	0.03	16	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02
15	PSS	0.2	16	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.09	0.09
16	PSS	0.03	19	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02	0.02
17	PEM	1.3	19	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Jones Ditch)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.80	0.80	0.80	0.80
18	PSS	0.2	12	No	Flood storage, sediment/toxin removal, wildlife habitat	Tributary (Jones Ditch)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00
19	PEM	0.8	19	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.05
20	PEM	0.5	12, 13	Yes	Toxin removal, wildlife habitat	Runoff, Groundwater	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00
21	PSS	0.03	12, 13, 20	No	Flood storage, sediment/toxin removal, wildlife habitat	Lindley Ditch	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Total Wetland Impacts Per Alternative:							0.92	1.22	3.32	0.92	1.22	3.32	7.42	7.72	9.82	7.42	7.72	9.82

### 5.13 Visual and Aesthetic Resources

This section examines both views to and from the road in determining the visual quality impacts of the US 31 alternatives. The area within the visual corridor is almost entirely developed by residential, agricultural, office, retail and industrial land uses. The No-Action Alternative would incur no impacts to visual and aesthetic resources. Upgrading US 31 to current freeway standards would affect the views to and from the surroundings differently.

Alternatives F1 through F6 are located within an existing roadway corridor. Therefore, the build alternatives would not create the same impacts to the visual quality typically associated with construction of a new transportation facility through a developed area. Nonetheless, visual quality would be impacted throughout the corridor by the development of new interchanges at each of the street crossings and the vertical alignment of the mainline as it approaches the elevated interchanges. Coherence throughout both the northern and southern portions would be improved. Currently, the highway corridor is a result of building and development that has been phased in over time. This reflects changes in primary building materials and methods.

Views to the roadway in the southern portion would be affected by the development of several key interchanges, including I-465, 116<sup>th</sup> Street, 126<sup>th</sup> Street, 131<sup>st</sup> Street, and 146<sup>th</sup> Street (Figures 5.13-1 through 5.13-8). These interchanges would take up more area than an at-grade crossing, bringing the road closer to the neighboring properties. Grade changes associated with the elevated mainline and interchanges would affect existing views across the roadway from the lower floors of the corporate buildings at 116<sup>th</sup> Street and 126<sup>th</sup> Street (Figures 5.13-1 through 5.13-7). The interchanges, ramps and alignment would also affect views from the roadway to adjacent developments at the interchanges.

In the northern portion views from the roadway to retail businesses would be impacted by the incorporation of interchanges at 161<sup>st</sup> Street and SR 32 (Figure 5.13-8). Views from the roadway of retail properties would also be impacted by the interchanges (Figure 5.13-9). The grade changes would not have an impact on the views of wooded areas. Reconstruction of US 31 would involve the addition of new transportation elements such as interchanges at 161<sup>st</sup> Street, SR 32, 191<sup>st</sup> Street, and SR 38, mainline roadway, bridges, lighting, and walls.

Alternatives G1 through G6 corridor is almost entirely developed as agricultural or residential. Views throughout this area would be impacted with the addition of the mainline roadway and interchanges at SR 32 (Figure 5.13-10) and 191<sup>st</sup> Street. Mainline paving, bridges, fences, guardrails and associated highway appurtenances would become part of the viewshed. The interchange at SR 32 would impact some views through the currently gently rolling area.

**Figure 5.13-1** Interstate 465 - US 31 Interchange: Aerial view looking northeast



**Current**



**Proposed**



**Figure 5.13-2** 116<sup>th</sup> Street Interchange: Aerial view looking north



**Current**



**Proposed**



**Figure 5.13-3** 116<sup>th</sup> Street Interchange: Ground view looking east



**Current**



**Proposed**



**Figure 5.13-4** 126<sup>th</sup> Street Interchange: Aerial view looking north



**Current**



**Proposed**



**Figure 5.13-5** 131<sup>st</sup> Street Interchange: Aerial view looking southwest



**Current**



**Proposed**



**Figure 5.13-6** 146<sup>th</sup> Street Interchange – Lateral Access Option: Aerial view looking South



**Current**



**Proposed**